I will be able to identify key features of quadratic relations in factored form and I will be able to write an equation from a graph.

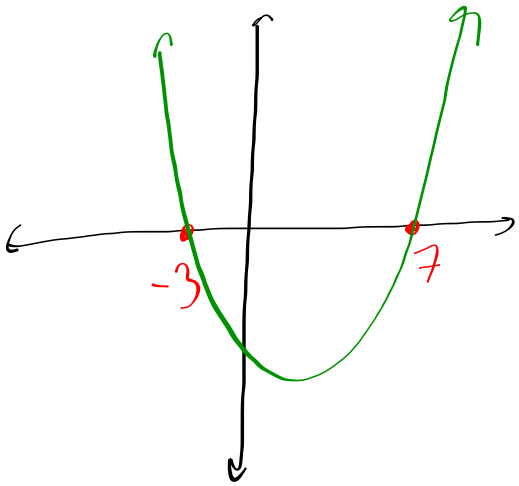
Checking In	Entry Question - on blue exit card sheets
Minds on	Whiteboards: Is it a parabola? Plus brainstorm
Action!	Factored Form
Consolidation	156 #2, 4ae, 6ab, 7ac, 11, 14 (challenge)

Checking In

The zeros of a quadratic relation occur at x = -3 and x = 7.

Determine the x-value of the vertex.

$$\frac{-3+7}{2}$$



Minds on

up

Is the graph of $y = 2(x + 1)(x - 5)$ a parabola? If so, in what direction does it open?

Table of Values			
x	y	First Difference	Second Difference
-3	32		
-2	14	-18	+4
-1	0	-14	+4
0	-10	-10	+4
1	-16	-6	+4
2	-18	-2	+4
3	-16	+2	

3.3 – Factored Form of a Quadratic Relation

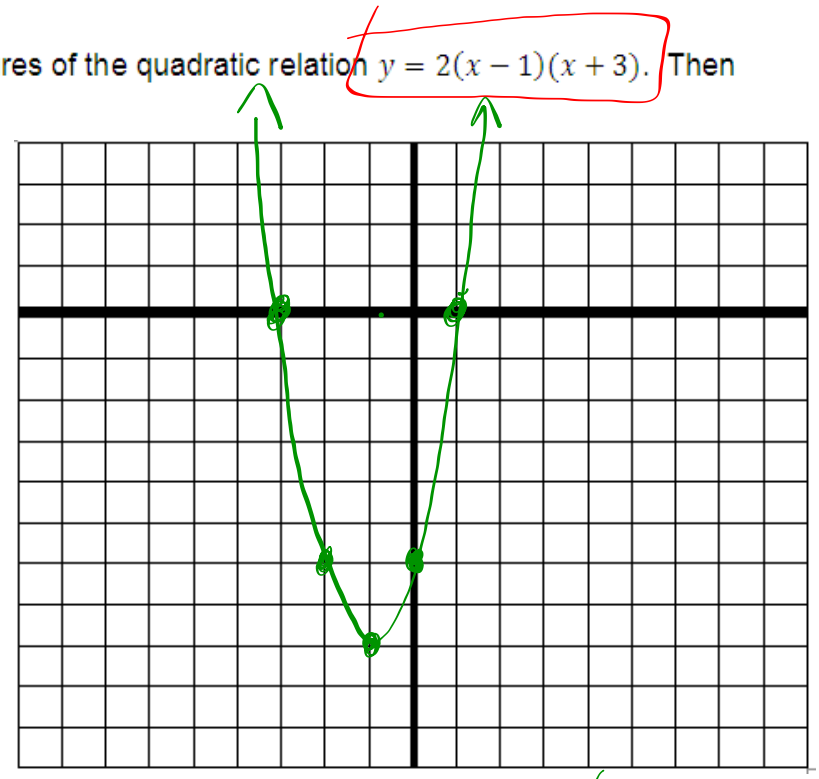
$$y = a(x - r)(x - s)$$

Why is this general form of a quadratic said to be in "factored form"?

Because a, (x-r), and (x-s) are multiplying by eachother.

Example1: Determine the key features of the quadratic relation $y = 2(x-1)(x+3)$. Then sketch the graph.

x	y
-3	0
-2	-6
-1	-8
0	-6
1	0
2	10
3	24



vertex = (-1, -8)

zeros = -3 and 1

y-intercept = -6

axis of symmetry = -1

Compare the graph and the equation. What do you notice?

The zeroes are in the equation but the signs are opposite.

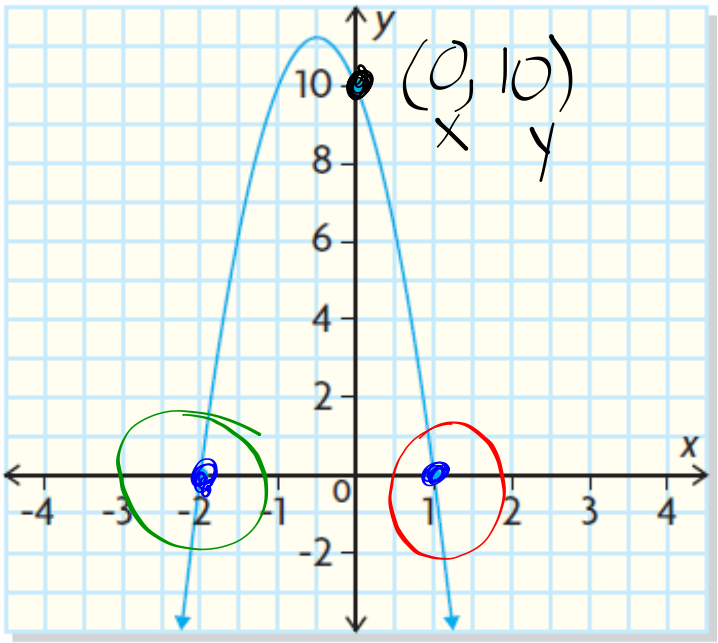
How could you use the zeros to determine the axis of symmetry?

The midpoint (go halfway between them)

How could you use the equation to determine the y-intercept of the quadratic relation?

Multiply the values (a, r, s) together.

Example 2: Determine an equation for this parabola.



$y = a(x-r)(x-s)$

$y = a(x+2)(x-1)$

$10 = a(0+2)(0-1)$

$10 = a(2)(-1)$

$\frac{10}{-2} = \frac{a(-2)}{-2}$

$a = -5$

$\therefore y = -5(x+2)(x-1)$

Key Points:

If a quadratic relation is expressed in the form $y = a(x - r)(x - s)$, Factored form

- the x-intercepts are r and s signs flip
- the equation of the axis of symmetry is the vertical line defined by the equation $x = (r + s) \div 2$ add zeroes, ÷ by 2
- the y-intercept is $c = a \times r \times s$ multiply #s together

Whiteboards

Does it open up or down?

$y = +1(x+1)(x-2)$

Whiteboards

What are the zeroes?

$y = -3(x-4)(x+5)$

4 and -5

Whiteboards

What's the axis of symmetry?

$$y = -3(x + 3)(x - 6)$$

Whiteboards

What's the vertex?

$y = 2(x - 1)(x - 7)$

Whiteboards

What's the y-intercept?

$y = 2(x-3)(x+1)$

Practice/Homework

Pg. 156 #4ae, 6ab, 7ac, 11, 14 (challenge)